

Claims:

1. A pipe-laying vessel including an upwardly extending tower assembly defining a path down which the pipe passes as a pipeline is being laid by the vessel, and a lower guide arrangement for guiding the pipeline after it has passed down the tower, the lower guide arrangement including a plurality of sets of guide rollers spaced apart along the path of the pipeline and defining the lateral limits of the path, the guide rollers being located such that they allow some bending of the pipeline as it passes through the lower guide arrangement.
2. A vessel according to claim 1, in which the guide rollers of at least one set of rollers include rollers whose axes of rotation, in a plane perpendicular to the tower, are inclined to one another.
3. A vessel according to claim 1 or 2, in which the guide rollers of at least one set of rollers extend at least one quarter of a revolution around the path of the pipeline.
4. A vessel according to claim 3, in which the guide rollers of at least one set of rollers extend substantially all around the path of the pipeline.
5. A vessel according to any preceding claim, in which the lower guide arrangement is of substantially trumpet shape flaring outwardly in the direction of travel of the pipeline during laying, and the angle of flare increasing in the direction of travel of the pipeline during laying.
6. A vessel according to any preceding claim, in which the guide rollers are freely rotatable.
7. A vessel according to any preceding claim, in which at least some of the rollers are mounted for rotation in bearings that are directly or indirectly resiliently displaceable.

- 25 -

8. A vessel according to claim 7, in which the resistance of the bearings to resilient displacement is more than 100kN/m.

9. A vessel according to claim 8, in which the resistance of the bearings to resilient displacement is more than 500kN/m.

10. A vessel according to any of claims 7 to 9, in which the bearings are resiliently displaceable by a distance of more than 50 mm.

11. A vessel according to claim 10, in which at least some of the bearings are resiliently displaceable by a distance of more than 100 mm.

12. A vessel according to any preceding claim, in which the inclination of the tower assembly is adjustable and the lower guide arrangement is secured to the tower assembly.

13. A vessel according to any of claims 1 to 11, in which the inclination of the tower assembly is fixed.

14. A vessel according to any preceding claim, in which the inclination of the tower assembly is in the range of 45° to 90° to the horizontal.

15. A vessel according to any preceding claim, in which three or more sets of guide rollers are positioned along the path of the pipeline below sea level.

16. A vessel according to claim 15, in which five or more sets of guide rollers are positioned along the path of the pipeline below sea level.

17. A vessel according to claim 15 or 16, in which the sets of rollers are spaced apart substantially evenly along the path of the pipeline.

18. A vessel according to any preceding claim, in which the spacing along the path of the pipeline between

adjacent sets of guide rollers is in the range of 2 m to 15 m.

19. A vessel according to any preceding claim, including means for monitoring the forces applied to the pipeline by rollers of the lower guide arrangement.

20. A vessel according to claim 19, in which a plurality of force monitoring means are associated with respective sets of guide rollers for monitoring the forces applied to the pipeline by the respective guide rollers.

21. A vessel according to any preceding claim including means for raising lengths of pipe from a deck of the vessel to a position aligned with the tower assembly and for joining such lengths of pipe to the pipeline being laid.

22. A method of laying a pipeline from a vessel, comprising lowering the pipeline down an upwardly extending tower assembly of the vessel and then through a lower guide arrangement, the lower guide arrangement including a plurality of sets of guide rollers spaced apart along the path of the pipeline and defining the lateral limits of the pipeline, the pipeline undergoing some bending as it passes through the lower guide arrangement.

23. A method according to claim 22, employing a vessel as defined in any of claims 1 to 21.

24. A method according to claim 22 or 23, in which forces exerted on the pipeline by one or more of the guide rollers are monitored and the operation of the vessel adjusted in dependence upon the monitoring.